

A PLEISTOCENE RECORD OF PSEUDOTSUGA
MACROCARPA

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Pseudotsuga macrocarpa (Torr.) Mayr. is an endemic species of the mountains of southwestern California which ranges from Mount San Pedro Martir in Lower California to the San Rafael Mountains of Santa Barbara County. It is commonly associated with *Pinus Coulteri*. In the vicinity of Figueroa Mountain, in Santa Barbara County, its range is contiguous to that of *Pinus Sabiniana*, which grows on the less protected slopes immediately below. A discontinuity in range of the width of San Luis Obispo County separates it geographically from the northern species, *Pseudotsuga taxifolia*. These two forest trees are closely related and are not readily separable in some of their morphological characters. They differ from one another primarily in the larger average size of the cone and in the greater rigidity of the cone scales of *P. macrocarpa*, as well as in certain little understood matters of tolerance that lie behind their difference in geographic range.

Both species, as well as certain presumably ancestral types, have been reported from the fossil record of western North America. *Pseudotsuga miocena* Penhallow (7, p. 70), *P. sonomonensis* Dorf (3, p. 72) and *P. Masoni* MacGinitie (4, p. 47) have been interpreted as bearing a relationship to *P. taxifolia*. Fossils determined as the modern *P. taxifolia* (5, p. 151) have been reported from Pleistocene deposits. *P. praemacrocarpa* Axelrod (1, p. 167), as the name indicates, was interpreted by its author as ancestral to *P. macrocarpa*. Wood has been found in a locality on the Mad River in Humboldt County, California, and referred by Penhallow (6, p. 68) to *P. macrocarpa* with the remark that "it is identical with the species as it grows on the adjoining hill." It is, therefore, obvious that Penhallow was dealing with *P. taxifolia*, since *P. macrocarpa* does not occur that far north.

Since *Pseudotsuga praemacrocarpa* from the Pliocene Mount Eden beds of southern California is the only authentic fossil record of the *P. macrocarpa* type, it is of interest to note the discovery of a specimen from the Pleistocene asphalt deposits at Carpinteria, California. This specimen closes the gap in the record from the Pliocene to the present. The occurrence of the fossil in the Carpinteria asphalt is not far from the northern limit of the species today in the Zaca Lake area, San Rafael Mountains, Santa Barbara County. The proximity of the two localities, however, in no way indicates the great difference in the habitat of the modern tree and that recorded in the Carpinteria flora. As reported by Chaney and Mason (2), the Carpinteria asphalt contains a maritime flora dominated by *Pinus radiata*, *P. muricata* and *Cupressus Goveniana*, with a conspicuous understory flora of

Arctostaphylos, *Ceanothus* and live oaks. In addition to this forest assemblage, there were elements of two other floras—namely, the coastal redwood flora of the north and the arid interior digger pine-juniper association. The species of these associations were represented by very fragmentary material. The first of these fragmentary floras is represented by a water-worn piece of wood of the genus *Sequoia* which was washed up on what is now a fossil

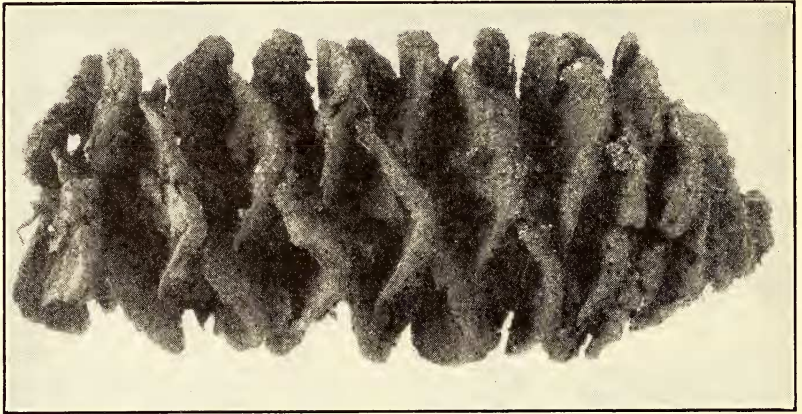


FIG. 1. Fossil cone of *Pseudotsuga macrocarpa*. Natural size.

beach. The absence of any other evidence of *Sequoia* and the nature of this occurrence led the writers to the conclusion that it did not grow in the immediate vicinity but was washed up by waves after a journey of considerable distance. The other of these floras is represented by a few fruits of *Juniperus californica* and *Arctostaphylos glauca* and a worn scale of a cone of *Pinus Sabiniana*. Both *Juniperus californica* and *Arctostaphylos glauca* are very prolific seed-producers and the scarcity of their seeds in the fossil record suggested that they could not have been produced close to the deposit but must have been borne by stream from some distance inland. The condition of the cone scale of *Pinus Sabiniana* and the absence of any further evidence of this species in so rich a fossil flora was accepted as evidence that it was not a member of the plant association in the immediate vicinity. It, too, must have been carried into the deposit by the stream in whose bed the fossils were laid down.

Pseudotsuga macrocarpa is another such element. It is not a coastal species but prefers the more arid interior mountains. It occurs in a zone at the upper limit of *Pinus Sabiniana* in close association with *Arctostaphylos glauca* and *Juniperus californica*. The fragmentary nature of the specimen attests its transport. Both ends of the cone are missing, the bracts are almost all broken off, and the scales all show marks of battering. In this deposit there are flowers with such delicate structures as stamens

preserved. It would seem that a woody cone, particularly if of local derivation, should be well preserved. Those cones of the other species in the deposit that are obviously from nearby are well preserved.

The cone was collected by Mr. David Rogers of the Santa Barbara Museum of Natural History and was sent to Dr. Chester Stock of the California Institute of Technology and later referred to the writer for identification. The specimen is now in the paleontological collections of the Museum of Natural History of Santa Barbara.

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A NEW SPECIES OF LECIDEA FROM BRAZIL

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Among the lichens collected by the late Ynes Mexia, indefatigable and enthusiastic botanical explorer, occurs a *Lecidea* which I am reluctantly compelled to describe as new. It is quite unlike anything described by Wainio in his classic study on the lichens of Minas Geraes, or any species mentioned by Zahlbruckner in his papers on Brazilian lichens.

Lecidea viçosensis sp. nov. Thallus effusus, tenuis, granulato-crustaceus, continuus ecorticatus, pallido fulvocinereo-testaceus, sorediis et isidiis destitutus, KOH—, CaCl₂O₂—. Apothecia biatorina, sessilia, primum planiuscula, parva, margine pallido et prominulo, dein magna difforma solitaria aut mox convexa aggregata-conglomerata, cervino-rufescente et nigricanti-fusco; hypothecium angustum umbrino-fuscum; hymenium I caeruleum; sporae octonae, in ascis biseriales, simplices, decolores, ovaes et ellipsoidae, 7.75-9.5 μ late et 15.5-20 μ longae.

Ad corticem arboris, Fazenda de Aguada, Viçosa, Minas Geraes, Brazil, Julio 31, 1930, legit Ynes Mexia 4295a.